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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR     | ATTORNEY DOCKET NO.    | CONFIRMATION NO. |
|--|-------------|--------------------------|------------------------|------------------|
| 10/615,048   | 07/08/2003  | James W. Blatchford, JR. | TI-35516 (032350.B504) | 8678             |
| 23494  | 7590        | 12/02/2004               | EXAMINER               |                  |
| TEXAS INSTRUMENTS INCORPORATED<br>P O BOX 655474, M/S 3999<br>DALLAS, TX 75265 |             |                          | LIN, SUN J             |                  |
|  |             |                          | ART UNIT               | PAPER NUMBER     |
|  |             |                          | 2825                   |                  |

DATE MAILED: 12/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/615,048

**Applicant(s)**

BLATCHFORD, ET AL.

**Examiner**

Sun J Lin

**Art Unit**

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07/08/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17 is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7,9-12 and 14-16 is/are rejected.
- 7) ☒ Claim(s) 3,8 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07/08/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>07/08/2003</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This office action is in response to application 10/615,048 filed on 07/08/2003.  
Claims 1 – 17 remain pending in the application.

### *Specification Objections*

2. The specification is objected to because of following informalities:

Page 5, line 1, change "DRAWINGS" to **—INVENTION—**.

Page 8, line 22, after "response" insert **—of—**.

Page 8, line 24, change "10" to **—110—**.

Page 8, line 27, before "aberration" insert **—lens—**.

Page 8, line 30, change "FIGURE 1" to **—FIGURE 2—**.

Page 9, line 19, after "preceding" insert **—responses—**.

Page 10, line 21, after "preceding" insert **—features—**.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1, 2, 4 – 7, 9 – 12 and 14 – 16 are rejected under 35 U.S.C. 102(a) as being unpatentable over U.S. Patent Application Publication No. 2003/0088847 A1 to Chang et al.

5. As to Claim 1, Chang et al. teach the following subject matter:

- A method for generating optical models 405 using lens aberration information 401 (i.e., lens aberration data) – [Fig. 4; abstract];
- Incorporating lens aberration information into various (stepper) processes – [Paragraph 0002]; allowing users to perform stepper (processes) and field

aberration dependent simulations – [Paragraph 0002]; Projection lens 104 (i.e., initial lens) is a single component, multiple simple lens elements mounted within a casing in an attempt to correct optical aberrations – [Paragraph 0008; Fig. 1]; Notice that performing stepper processes is to adjust a lens aberration of one or more lens aberrations of Projection lens (initial lens);

- Stepper Processes – Because only a portion of the wafer can be written at one time, components of lithograph system must be physically stepped, or scanned, across the wafer to expose other portion of wafer – [Paragraph 0007]; Notice that (1) a stepper process is determined based on a wafer response to the adjustment of lens aberration (2) lens aberration information (lens aberration data) is generated according to the wafer response;
- A set of Zernike polynomials (i.e., Zernike functions) are used to described the types of aberrations – [Paragraph 0011, 0012]; Notice that (1) the Zernike polynomials (Zernike functions) are aberration functions (2) one of aberration functions is selected to described a type of aberration;
- An aberration function that matches (i.e., fits) the lens aberration information (lens aberration data) in applied to optical model generator 403 to generate a optical model – [Fig. 4]; Notice that the optical model indicates the wafer response to one or more lens aberrations of the Projection lens (initial lens).

For reference purposes, the explanations given above in response to Claim 1 are called **[Response A]** hereinafter.

6. As to Claims 6, 11 and 16, reasons are included in **[Response A]** given above.

7. As to Claims 2, 7 and 12, reasons are included in **[Response A]** given above.

8. As to Claim 4, in addition to reasons included in **[Response A]** given above, Chang et al. show and teach the following subject matter:

- Receiving aberration content, which is included in the lens aberration information 401, describing one or more lens aberrations associated with a lens – [Fig. 4];
- Applying the optical model 405 generated by optical model generator 403 to a pattern design in a simulation engine 404 according aberration content associated with each stepper process to identify an error – [Fig. 4];

- Performing a (optical) proximity correction (OPC) for the error in OPC/Verification Tool – [Fig. 4].

For reference purposes, the explanations given above in response to Claim 4 are called **[Response B]** hereinafter.

9. As to Claims 9 and 14, reasons are included in **[Response B]** given above.

10. As to Claim 5, in addition to reasons included in **[Response B]** given above, Chang et al. show and teach the following subject matter:

- Optical model, mask pattern within a predetermined amount of permitted critical parameter variance, ranking best steppers based on mask data (i.e., wafer response) – [Paragraph 0019];
- OPC and Verification Tool 412 – [Fig. 4]; Notice that the verification tool is applied in identifying an error of pattern design and the error is correctable or not by using optical proximity correction (OPC) – [Paragraph 0019].

For reference purposes, the explanations given above in response to Claim 5 are called **[Response C]** hereinafter.

11. As to Claims 10 and 15, reasons are included in **[Response C]** given above.

### ***Allowable Subject Matter***

12. Claim 17 is allowed. Claims 3, 8 and 13 are objected to as being dependent upon a rejected base claim, but they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Those claims are allowed is because that the prior art does not teach or fairly suggest the following subject matter:

- Determining a sensitivity of the one or more locations of pattern design to one or more lens aberrations associated with a plurality of exposure tools in accordance to response data for each aberration content set in combination with other limitations as recited in Claim 3, Claim 8, Claim 13 and Claim 17, respectively.

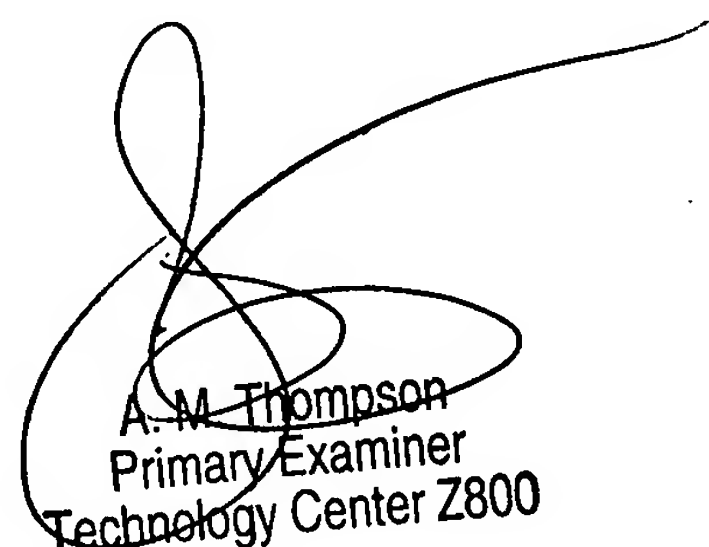
**Conclusion**

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sun J Lin whose telephone number is (571) 272 - 1899. The examiner can normally be reached on Monday-Friday 9:30AM - 6:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S Smith can be reached on (571) 272 - 1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sun James Lin  
Patent Examiner  
Art Unit 2825  
November 22, 2004



A. M. Thompson  
Primary Examiner  
Technology Center Z800